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ABSTRACT

A procedure was developed for on-site evaluation of replications of exemplary programs that emphasized the replication of the functions accomplished rather than the processes performed. Program functions are defined as operational purposes. A functional analysis begins with identifying program components: describing them fully; and then listing the inputs, processes, and outcomes of each stage and tracing the relationships among them. The next step is to write concise descriptions of the functions of each component of functionally related activities. This procedure has been found to be more sensitive and comprehensive than one that derives a list of functions directly from a description of the program. The basic purpose of this functional analysis is to provide a framework for studying and evaluating program implementation in adopter sites. Interview instruments are developed from listed functions. Resources and activities are analyzed to determine if they are fulfilling their intended functions. Functions that are not fulfilled are noted and alternatives are looked for. Finally data not related to intended functions are reviewed. (Author/CTM)

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FUNCTIONAL ANALYSIS OF EDUCATIONAL PROGRAMS

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ABSTRACT

Functional Analysis of Educational Programs

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The assertion that replication of program processes will lead to replication of outcomes has long been a mainstay of official diffusion policy; belief that modifications are necessary and desirable has long been characteristic of craft knowledge. The twain meet, compatibly, in a perspective based on "functional analysis" of exemplary programs. In this approach, the intended functions of program components, rather than their specific processes, constitute the basis for analyzing program operations. In this paper, a rationale for functional analysis is developed; then a procedure for conducting functional analysis and some implications for diffusion policy, practice, and research are described.

The Western intellectual tradition came up with the idea some centuries ago that knowledge is cumulative, that there is a logical, empirical progression from one level of understanding about events to the next. A basic premise of this idea is that a particular "piece" of knowledge can be proved and re-proved by replicating the methods that first led to its discovery. This attitude toward replicability evolved in the laboratory and physical sciences, where it has usually been possible to control the inputs and context of an experiment.

In recent decades, social scientists have postulated the same premise for social processes, hoping to gain the same credibility for their findings as "hard" scientists had for theirs. Thus, the replicability paradigm rose to prominence in the social sciences as a spin-off of its power in the natural sciences. It became the rule that if you wanted to replicate results in social programs, you should replicate methods.

In due course, the concept of replication came to be considered appropriate for application to the diffusion to new locales of instructional programs that had been successful in their original sites. The culmination of this orientation in American education was the development of program implementation materials stipulating that new program users replicate the methods of the developers in order to achieve the same successes as had been realized in the developers' sites. The United States Office of Education (USOE) awarded a contract to RMC Research Corporation in 1973 to develop such materials. The resulting products were dubbed Project Information Packages (PIPs).

A series of research-and-development projects and evaluations about the PIPs led RMC to conclude that, while it was indeed possible to describe developer-site project features and activities in sufficient detail to enable adopters to replicate projects, achieving replication of results required more. In particular, adopters' motivation, contexts, and resources had also to be appropriate before the same outcomes might be attained. (See Horst, Piestrup, Foat, & Binkley, 1975; Campeau, Binkley, Hawkridge, & Treadway, 1978; Campeau, Binkley, Treadway, Appleby, & Bessey,

1979; Treadway, Stromquist, Foat, Fetterman, & Tallmadge, 1979; Horst, Johnson, Nava, Douglas, & Valdez, 1979; Treadway, Douglas, & Nava, 1980.)

The findings and conclusions by RMC and our co-investigators are hardly surprising. The idea that different personnel in different locales must adapt programs to some extent was not original with RMC. It is only common sense that different people in different situations need to effect different structures and undertake different activities to achieve comparable results. Notably this idea was suggested by Miles (1964b), Atwood (1964), Clee and Reswick (1964), Colvard (1964), and Marsh (1964) in the seminal work edited by Miles (1964a) a decade before it became a mainstay of educational-dissemination discussion through the work of Berman and McLaughlin (1975), to wit:

> The installation of an innovation in a system is not a mechanical process, but a developmental one, in which both the innovation and the accepting system are altered. (Miles, 1964b). [Emphasis added.]

Furthermore, these allusions to the necessity for adaptation are not the earliest. They are themselves based on long-standing recognition in both scholarly and craft knowledge that new contexts and different staff capabilities make adaptation of specific program features and processes necessary for successful implementation in new sites.

The idea that replication of specific, successful, original-site processes is necessary to lead to replication of results seems convincingly refuted. I have a certain reluctance to let go of the thought of replication of instructional processes at the interface between teacher and pupil. Rumblings in the field of actual-learning-time correlation to achievement gains make me hesitate, especially when coupled with my own experience with dissemination of very specific, structured instructional techniques. Nevertheless, without doubt it has been shown that replication of non-instructional or non-treatment, processes and activities has little bearing on replication of instructional and other treatment functions (see Treadway et al., 1979). There is a large variety of ways for

an adopting site to provide the functions provided by the original project in the original site.

Though the refutation of the idea of replicating exact processes or resources seems quite sound, there nevertheless remains the fact that something, or some combination of things, led to exemplary results in an exemplary program's original site. I believe it is the mix of functions accomplished in the original site that accounts for a program's success. Further, I believe that, if it is to effect the same positive results, an adopting site must accomplish the same functions--i.e., replicate functions--within the opportunities and constraints presented in the new context. Thus I have shifted my focus in research on implementation and effectiveness to discovering if an adopter is fulfilling the functions accomplished in the original site, regardless of specifically how.

A program function is best defined as an operational purpose. For instance, in a program we are currently studying it is important for staff members to share their observations about students and develop coordinated approaches for dealing with problems or difficulties a given student is exhibiting. In the original program, this was accomplished by holding regular staff meetings to discuss students' progress. In the meetings, each student was discussed and any problems were singled out for extended consideration and some sort of follow-up planning and action. In the materials and training they created for adopters, the developers recommended quite specific procedures for these meetings, and expected adopters to follow them. In practice, adopters felt the developers' procedures were inappropriate for their situations. One adopter site developed its own approach to dealing with this issue, and this approach proved to accomplish the intended function more effectively than the developer-recommended procedures. Eventually, all adopters incorporated the approach of the initiating adopter and realized similar positive results. Thus, a major departure from replicating original-site procedures led to more effective fulfillment of the intended program function.

This example illustrates the appropriateness of adopter adaptation of specific original-site practices, because it also illustrates that there is more than one way achieve a particular program purpose. Though under some conditions it may be tempting to cite the need to allow adopter flexibility in how to accomplish a purpose as a license for adopters to abandon a purpose altogether, this example, I believe, also demonstrates the importance of adopters fulfilling all project functions, regardless of how they do it. It is inconceivable that in the case of this program it would be at all reasonable to drop this function and still expect the same student outcomes. The program hinges on providing close, coordinated personal attention to each student. Some method of staff coordination and communication about students' progress and problems is essential to providing the total treatment.

Exactly how best to fulfill a needed function depends on the combination of contextual and resource variables operating in a new site. If, as I feel is true, success in replicating outcomes depends on the ability of adopting sites to fulfill the program functions, then replication of specific processes is less important than seeing to it that functions are fulfilled. It follows that for dissemination and implementation purposes, it is therefore important to be able to analyze project functions. Functional analysis is a method for doing this. In this paper I hope to relate what functional analysis is, how it evolved, what its purpose is, how to do it, and what some of its implications are for dissemination/implementation practice, policy, research, and theory building.

What is Functional Analysis?

The term "functional analysis" refers to a procedure for determining the intended functions of program components. For instance, it is the function of one component of a project to create and maintain a good working relationship with the LEA administrative structure. This is necessary because the project needs two vital forms of assistance in order to operate. First, the project--an alternative, career-education-oriented high school--

needs access to the public schools to recruit students, and access to applicants' school records to determine their eligibility and to plan programs for them. Second, the LEA must license the school to award credits and grant valid high-school diplomas. Without such permission, the school has little chance of surviving, for few potential students would be attracted to it. Other forms of LEA assistance are desirable, such as school lunches or bus passes for students. These kinds of services can enhance operations, but the first two mentioned are crucial. Thus, the cooperative support of the LEA is critical to the operation of the alternative high school.

Under the dominant paradigm of structural and procedural replication, the focus of analyzing this project would be on specifying exactly how the original project succeeded in establishing and maintaining a good working relationship with the LEA in its site. Once identified, the structures and procedures would be described so adopters could replicate them, on the premise that such replication would lead to facilitative project relationships with the LEAs in new sites. Moreover, project disseminators would encourage, if not insist, that adopters undertake the "model" activities with minimal modifications. Sanctions might even be imposed or threatened to motivate adopters to follow the recommended procedures faithfully. Also, evaluators and implementation researchers would focus on the extent to which adopters replicated original-site practices.

This approach to dissemination and implementation ignores the fact that differences between originating and adopting sites' contexts and staff capabilities usually militate against applying the same procedures to accomplish the desired outcomes. It would be more productive for analysis to focus on the <u>functions</u> served by the originating site's structures and practices, for it was the fulfillment of these functions--not their specific operationalizations--that enabled the original site's success.

Functional analyses, while it does not ignore the ways the originating site accomplished project functions, goes further, to determine the functions served by the original methods. Under this approach project

dissemination would begin by specifying originating-sites' practices as a beginning step to determining the functions served. Technical information would be passed on to adopters with the focus on functions, and technical assistance would concentrate on helping adopters understand the functions and devise ways to accomplish them within their contexts. If the evidence accumulated by researchers to date is in fact valid, this approach would more reliably lead to successful implementation and eventual replication of project results. It is, of course, the replication of results to which exemplary-project dissemination ultimately aspires.

Doing a functional analysis of an educational program entails several steps. These are described below. The point here is that without such an analysis, it is unrealistic to expect adopters to achieve desired results or researchers to analyze project implementation and operation appropriately or accurately. That is, I feel it is impossible for a researcher to understand a project's implementation or operation without first determining what is to be accomplished, regardless of the form it may take or the activities it may involve. Thus it is imperative that before collecting data in the field the researcher fully analyze and understand what the various activities are supposed to accomplish. Functional analysis of an educational program is the process by which the researcher is led to this appreciation of what the project staff is trying to do.

Evolution of Functional Analysis

RMC came to recognize that local adaptation of program processes is important through a series of studies designed to test the efficacy of the concept that exact replication of program processes would lead to replication of results. In these studies, empirical data supported the long-held practitioner contention that adaptation is necessary to accommodate new sites' resources and environments. This finding was strongest in regard to program structure and management procedures. Indeed, their forms almost inevitably must be adapted to fit the circumstances of context and staff members' capabilities and interests. These conclusions find support in both the literature and the practical experience of program adopters.

In one adopting district after another, deviations from the operational guidelines of the PIP implementation materials failed to lead to detectable inadequacies in delivering the treatment. Rather, we found either that the appropriate treatment was implemented regardless of the extent to which the specified program structure or administrative procedures were modified or that assiduous replication of program structure and non-instructional procedures failed to lead to replication of treatment. In short, there was little correlation between replication per se and implementation of intended treatment.

This finding led to further thought about the importance of replication of project features. In the absence of evidence that replicating methods led to replicating instructional treatment or outcomes, what was it important for adopting sites to do? Though in hindsight it appears obvious, it gradually became clear that it had been, all along, the functions of the procedures that needed replicating, not the exact methods for accomplishing them. That is, it was important for regular staff development activities to occur, for instance, not for them to follow a particular sequence or format. What was important for a new site to do was to ensure that the functions accomplished by the original-site activities or procedures were effected, in whatever way best suited the context of the new site and the resources, including staff abilities, available to the program. Thus, the emphasis shifted from identifying program processes to identifying their intended functions or purposes. At this point, I believe these functions are the important aspects of program implementation and operation.

On the basis of our conclusions about the importance of the functions of program components, I believe it is critical for a researcher studying program implementation to identify those functions before analyzing observed program practices. The lack of such prior analysis multiplies the chance of misinterpretation of implementation events or greatly delays real understanding of their meaning and significance in the context of the adopter site.

Functional Analysis Procedures

Analyzing the functions of a project begins with identifying project components and describing them fully, using a procedure for generating project models RMC developed for the PIP studies. Model development entails listing the inputs, processes, and outcomes of each implementation stage and tracing their relationships to each other. The outcomes of one stage--e.g., planning--make up the inputs of the succeeding stage--e.g., start-up. (The procedure and its application in earlier situations are described in Horst, et al.,1975, and Horst & Treadway, 1978.) A completed model of a project sets forth all project resources and processes in concrete and behavioral terms. A set of descriptive conventions has been developed to categorize the resources and processes generically and consistently across projects.

On the basis of the project model it is possible to identify clusters of functionally related activities. These clusters we call project, or program, components. Earlier conceptions of the desirability of replication held that an adopter site should implement these components exactly as was done in the developer site to replicate developers' success. As our studies with the PIPs repeatedly showed, this was not the case. However, the experience of modeling projects and thinking of their practices in terms of generic descriptors led to realization that the clusters of practices contributed to fulfilling some function, such as working with the LEA administration to facilitate project operations. Experience and reflection led to the conclusion that the functions, not the specific procedure for getting them done, were critical to project success.

Therefore the next step in conducting a functional analysis of a project is to write concise descriptors of the function(s) of each component. For instance, the functions of a component called "LEA relationships" in the alternative high school mentioned above are (a) to elicit LEA permission for the program to grant high school credits and valid diplomas; (b) to get LEA cooperation in recruiting actual and potential high school dropouts (about whom the LEA typically has the best available identifying

and locating information); (c) to work out efficient channels for transmitting transcripts, attendance data, graduation requirements, and so forth; (d) to assure the program meets LEA criteria for operating a diploma-granting secondary instructional program; (e) to be sure all reports about the program required by the LEA are produced and delivered; (f) to elicit whatever other supportive services might be available from the LEA (e.g., school lunches for project students); and (g) to maintain positive affect and smooth, efficient procedures between the program and the LEA. If these functions are being fulfilled by the program, then it is reasonably sure the LEA will play its critical role vis-à-vis the program supportively and cooperatively. Without the LEA's support and cooperation, on the other hand, it would be extremely difficult for the program to succeed, or even to begin operating.

It may be that this procedure for identifying program functions appears cumbersome and redundant. Why could not an experienced and sensitive analyst of educational projects just read a description of a project and list the critical functions from that? This would eliminate the admittedly time-consuming and inelegant modeling procedure. In fact, we have attempted this more direct approach. We found it led to a close approximation of the list of functions obtained by going through a complete modeling exercise, but it left out a substantial number of details about resources and practices that greatly enriched our understanding of both the program and the adopter-site context. It also led to an incomplete analysis of the overlap and interaction among components, because in the modeling process each outcome of an implementation stage is explicitly linked to all the inputs and processes that contribute to it. In short, the specificity and the input-process-outcome linking enhanced the identification of functions, and in turn measure development and data collection and analysis. Thus, though an expert can indeed generate a fairly complete functional description of a program without formally modeling it, the analysis is made significantly more sensitive and comprehensive by retaining the modeling step. The modeling procedure also yields

a detailed description of the resources and activities required to accomplish a component's function in the developer site. This description provides a good starting point for developing data-collection approaches and instruments because it alerts the researcher to look for comparable resources and activities--i.e., those that are used to effect the relevant functions--in adopting sites.

Using Functional Analysis in Studying Implementation

The basic purpose of functional analysis, as stated earlier, is to provide a framework for studying and analyzing program implementation and operation in adopter sites. The emphasis on functions leads the researcher to allow for adaptations to developer-site inputs and processes, while it maintains focus on accomplishing intended program purposes.

The use of the descriptions of components' functions, resources, and practices in the field study of program implementation begins with developing observation and interview instruments. Basically these instruments list the resources and practices of the original program as a guide for the researcher to use in site visits and other data collection. On site, the researcher looks for and asks about the listed items and notes which are present and how they operate. When a listed resource or practice is not evident, the researcher is cued to refer to the function it serves and ask adopters how they are approaching that function. For instance, the absence of a specific individual on the staff to deal with the LEA would cue the researcher to ask about this component. In the alternative high school program, we learned in this way that the duties of a liaison person whose role in the developer site was exclusively to deal with the LEA, had been allocated to the director and the supervisor of instructors, with no discernible attenuation of the function of either the LEA relationship component or the other roles these two staff members perform. If we had been looking only for the adopter site to replicate specified staff positions and activities, we could easily have concluded that, because there was no school-liaison person on the staff, this function was being

neglected. By focusing on functions we learned that this critical component was present and how it was being operated.

Once data are collected from the field, analysis proceeds in three stages. First, the developer-specified resources and activities that are present in the adopter site are analyzed to determine if they are fulfilling their intended functions. Second, any functions that are not being fulfilled by specified resources or activities are noted, and data from the site are reviewed to see if alternative or adapted resources or activities are in place to achieve them. Finally, site data that remain unaffiliated with intended functions are reviewed to determine what they tell about program implementation. These three analytical steps successively account for each intended program function and all data about program implementation in a given site. The product of analysis is a set of findings about the status and process of implementation of the program in its new site.

The final two steps in using this approach to investigating implementation are to use the findings about project implementation and functions to draw conclusions about the program's status and the process of its implementation, and to make recommendations for specific program actions or about diffusion policies and structures, if they are warranted. Recommendations may be made for a variety of audiences and purposes, depending on what level of the overall diffusion/implementation mechanism each recommendation is aimed at. For instance, in the case of studying the alternative high school we made recommendations to program implementors, the dissemination/technical-assistance contractor, executive agencies involved in the demonstration, and the policy-making community. While I would not presume to assess the impact of these recommendations at this point, we felt the advice we gave was pertinent and well founded. At least one concrete result of the recommendations was that the funding agency for the demonstration allowed a more reasonable planning and preparation period to a second contractor subsequently selected to implement the project in another site. Rather than three weeks, the agency gave the second contractor six months for making preparations. Early observations of the

program set up by the second contractor suggest this extended preparation period has led to a much better thought out and organized initial program operation. This event is heartening if for no other reason than that it indicates research findings can have an impact on federal-agency behavior. That at least is gratifying to my personal sense of efficacy.

Implications of the Functional-Analysis Approach

The study of implementation is a difficult task to accomplish well. There is no precise science of implementation that can tell specifically how to do it. The contexts in which programs are attempted vary widely. About all we know is that different contexts require different approaches to implementation. The notion that replication of specific implementation procedures will consistently lead to specific results has been convincingly refuted, by RMC's work and by that of many others. Nevertheless, it is equally certainly true that something led to success in the original site of an effective program. Otherwise, the developer site never would have achieved the results for which the project was judged exemplary and worthy of imitation. In my view, it was the ability of the developer-site program staff to accomplish a set of functions, in a particular combination, that led to success. This paper has briefly stated my reasons for that view.

If the idea that recapitulation of functions leads to replication of outcomes stands up, it is reasonable to encourage adopters to focus on functions rather than on specific structures or processes. This has major implications for dissemination practices, policy, research, and theory building.

With regard to practices, the implications include the following. First, developers need to examine their programs from a functional perspective, so they can describe their practices in ways that will encourage potential adopters to consider the functions they must plan on accomplishing if they elect to adopt. Second, developers, or disseminators, must

construct their training, technical-assistance, and monitoring activities so they focus on ways to accomplish program functions effectively in new sites. In these ways, those who impart information about projects can help potential and actual adopters see the relevance and practical import of the information.

From the adopters' perspective, it would be most beneficial for them to understand that they must make adoption and implementation decisions on the basis of the realistic probablilities of actually accomplishing the intended program functions given the realities of their situations. It might therefore be a good idea for diffusion systems--such as the National Diffusion Network and the Research and Development Exchange--to add to their general awareness messages the caveat that potential adopters should consider the practicability of actually achieving program functions in their adoption-decision deliberations. Unless adopters can actually fulfill program functions, there is little reason to suspect they can subsequently replicate the outcomes that attracted them to the program in the first place.

In the policy area, a functional perspective on implementation implies less rigidity by sponsoring agencies about appropriate methods of implementation and about expectations of "instant" achievement of full operational status and replication of program outcomes. It also implies that approaches to evaluating adopter-site program success should be modified so as to avoid impinging on implementation. It would in fact lead to a new evaluation paradigm for looking at adopters' programs. This paradigm would include a period of time when the sole focus of research would be to document that the program's intended operational functions were being fulfilled--as well as can be determined. Only after full implementation had been accomplished would it be appropriate, in this approach, to test for program outcomes or hold adopters responsible for attaining the same results as developers.

The research (and I include evaluation within the confines of research) implications of functional analysis devolve on two issues.

First, if functional analysis seems a reasonable way to approach the replication issue, then researchers must approach their collection and interpretation of data about adopter-site implementation practices from a functional perspective. They must employ sound methods for identifying program functions and develop realistic approaches to determining if program adopters recognize and are achieving intended functions, and they must do so without intruding on the implementation process.

Second, researchers must find more successful ways to convey the appropriateness of a functional perspective to sponsoring-agency program officers. It has been a frustrating experience to try to convince program officers not to insist either on adopters following developers' practices meticulously or on researchers reporting on the extent to which adopters faithfully replicate practices. This constitutes a call for the research community to educate program officers about the validity of adaptation to accomplish intended program functions. Though the findings of the Rand study (Berman & McLaughlin, 1975; 1978) have conveyed this idea strongly to educational program monitors, a strong commitment to replication of processes still exists in other areas, for instance youth programs sponsored by the Department of Labor. Until program monitors recognize the validity of a functional perspective, I believe they will continue to try to force adopters to replicate specific processes and resources. To the extent they do, program implementation will continue to be more difficult than it inherently already is.

In terms of theory building about dissemination and implementation processes, a focus on project functions implies a fundamental re-evaluation of the procedural-replication paradigm. The real world in which projects are implemented is not a laboratory in which the contextual variables and resources can be reliably and precisely controlled by those charged with getting a project started and stably operating. Theories of dissemination and implementation must be adjusted to allow for this variability. So must prescriptions based on theories.

Though it is a demanding suggestion that a functional perspective be both practically and officially accepted, it is also in concert with what we know to be true about program implementation. That is, implementation is not an easy job. It requires a large amount of dedication and ad hoc decision making to get a program successfully off the ground. Local contexts in which a program might be attempted vary widely, and implementation practices must be adapted to these contexts, or there is little chance full operation will be effected. Focusing on intended and achieved project functions seems a more realistic perspective from which developers, disseminators, adopters, researchers, and sponsoring agencies should operate when the ultimate intent is to achieve the same outcomes in new sites as in original sites.

REFERENCES

Atwood, M. S. Small-scale administration change: Resistance to the introduction of a high school guidance progr m. In M. B. Miles (Ed.), Innovation in education. New York: Teachers College, Columbia University, 1964.

Berman, P., & McLaughlin, M. W. Federal programs supporting educational change, Volume IV: The findings in review. Santa Monica, CA: The Rand Corporation, 1975.

Berman, P., & McLaughlin, M. W. Federal programs supporting educational change, Volume VII: Factors affecting implementation and continuation. Santa Monica, CA: The Rand Corporation, 1977.

Berman, P., & McLaughlin, M. W. Federal programs supporting educational change, Volume VIII: Implementing and sustaining innovations. Santa Monica, CA: The Rand Corporation, 1978.

Campeau, P. L., Binkley, J. L., Hawkridge, D. G., & Treadway, P. G. First year report: Evaluation of Project Information Package dissemination and implementation, Palo Alto, CA: American Institutes for Research and RMC Research Corporation, 1978.

Campeau, P. L., Binkley, J. L., Treadway, P. G., Appleby, J. A., & Bessey, B. L. Final report: Evaluation of Project Information Package dissemination and implementation. Palo Alto, CA: American Institutes for Research and RMC Research Corporation, 1979.

Clee, J. E., & Reswick, J. B. Collaboration in teaching and learning: An experimental course for engineering students. In M. B. Miles (Ed.), Innovation in education. New York: Teachers College, Columbia University, 1964.

Colvard, R. The colleges and the "Arkansas Purchase" controversy. In M. B. Miles (Ed.), Innovation in education. New York: Teachers College, Columbia University, 1964.

Horst, D. P., Johnson, D. M., Nava, H., Douglas, D. E., & Valdez A. M. Evaluation of bilingual project implementation via Project Information Packages: First year report. Mountain View, CA: RMC Research Corporation, August 1979.

Horst, D. P., Piestrup, A. M., Foat, C. M., & Binkley, J. L. Evaluation of the field test of Project Information Packages: Volume II: Recommendations for package revisions. Mountain View, CA: RMC Research Corporation, 1975. (UR 293; ERIC: ED122 374)

Horst, D. P., & Treadway, P. G. Project and dissemination-system models for use in evaluaiton. Paper presented at the 1978 Dissemination Forum, Arlington, Virginia, 14 August 1978.

Marsh, P. E. Wellsprings of strategy: Considerations affecting innovations by the PSSC. In M. B. Miles (Ed.), Innovation in education. New York: Teachers College, Columbia University, 1964.

Miles, M. B. (Ed.). Innovation in education. New York: Teachers College, Columbia University, 1964(a).

Miles M. B. Innovation in education: Some generalizations. In M. B. Miles (Ed.), Innovation in education. New York: Teachers College, Columbia University, 1964. [1964(b)]

Treadway, P. G., Douglas, D., & Nava, H. Planning and start-up of the Colegio Multicultural Bilingue. Mountain View, CA: RMC Research Corporation, March 1980.

Treadway, P. G., Stromquist, N. P., Foat, C. M., Fetterman, D. M., & Tallmadge, G. K. Study of the Career Intern Program. Final report--Task A: The process of implementation. Mountain View CA: RMC Research Corporation, 1979.